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November 13, 1998

Response and Comments to DEIS/EIR
Headwaters-Palco SYP-HCP. Refer to
permit numbers PRT-828950 and 1157:

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My strategy in addressing the DEIS/EIR for
the Headwaters-Palco SYP-HCP is built
around the interdisciplinary idea of risk. Here
I use the definition of risk as the probability
that some adverse effect will occur (Molak,
1997; Cothorn, 1996). For my conclusions see
the boxed section near the end of this
response.

Also, rather than producing an overly long
analysis, I refer to the imprecise nature of

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can.

many ecological interrelationships and the subjective mode in judgements from field observations which can be distorted by hierarchical decision-making and confusion from incompatibility. In system theory, as the size of the system increases, the precision of measurable variables decreases. Since there are more alternate descriptions of a large systems (ecosystem, system of habitats, etc.), typically more variables can be measured (Rosen, 1979; Zadeh, 1973; as noted in Bosserman and Ragade, 1982).

Because of the infeasibility of the sampling of entire ecosystems, the determining macroscopic properties are difficult to pin down. One method which assists in combining disparate values from social, economic, and ecological sectors to assist government agencies in making complex decisions about naturally imprecise ecosystems is the use of the tool of fuzzy sets. (Bosserman and Ragade, 1982; Harris and Stocker, 1998; Kandel, 1986; Meesters, et. al., 1998; Nguyen and Walker, 1997; Todd and Burgman, 1998).

In fuzzy sets the memberships in the set may be legitimately unclear. This fits in well with the development of ecosystem concepts, and can be expressed in ordinary language as well as in mathematical symbols, in many cases (Bosserman and Ragade, 1982). I call the study resulting an example of fuzzy risk analysis.

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In order to present this fuzzy risk analysis here, it is necessary to quickly review the risk management assessment process. Here we use a table from Schnare (in Cothorn, 1996):

Table 1

The Risk Management
Assessment Process

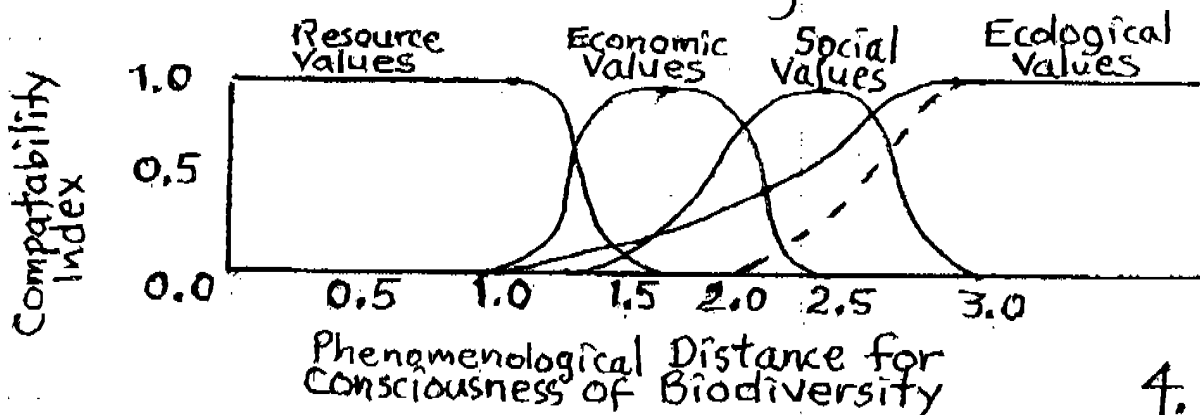
- Resource Assessment (current human and ecosystem health)
- Societal Values Assessment
- Hazard Assessment
- Dose/physical change-response assessment
- Exposure response assessment
- Prevention and control cost assessment
- Benefit Valuation assessment
- Risk, cost and benefits characterization (including marginal or incremental benefits—cost comparison of risk management alternatives)
- Presentation of analytical results, uncertainties, and implicit social and professional values and biases

This table is compatible with the DEIS/EIR Headwaters-Palco SYP-HCP organization and contents. I have found the above table to have a good fuzzy overlap with the chapter headings, appendices, and organization of contents in the DEIS/SYP for Headwaters-Palco.

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For example, the DEIS/EIR category for "Public Involvement" overlaps with "Societal Values Assessment" and "Hazard Assessment" (to name only three) in the Risk Management Assessment Process from Table 1, preceding. In the case of the term "values" as in "Societal Values Assessment," the thorny proposition of "consciousness" as a value is introduced by us, and thus questions such as about religion, art, and social opinion, which are altogether difficult, are legitimated. They are legitimated as questions because their fuzziness is already scientifically justified by our having accepted real imprecision into the approach.

Since these societal values which are generally imprecise are relative to all headings in the DEIS/EIR as socially relevant, then there is no way that we can legitimately avoid having to test the phenomenological dimensions of intentionality directed from the multidisciplinary points of impact as being both sociological and ecological. A fuzzy-set-theoretical classification shows this something like



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The preceding graph means that for some resource values, some economic values, and some social values (the highest values for these categories), they are highly compatible with the highest ecological values only providing that the appropriate (referring back to Table 1) risks for these have been assessed according to both a sufficient compatibility index and according to suitable and partly very fuzzy social and other criteria concerning aesthetic or religious values. These latter values would determine the numeration for the phenomenological distance (lower horizontal axis of the above graph) for the socially coordinated ecological values for consciousness of biodiversity (Takacs, 1996) as associated with economic and resource values for human needs. Most importantly, however, a scientific analysis concerning human needs must be corrected by both quantitative and qualitative phenomenological distance along the lower horizontal axis and to adjust the compatibility index.

Also note that the more highly biodiverse phenomenological distances for conscious values, may be either high or low for such other values as those ecological or social, as borne out by the existence of certain unecological social values and by the existence of unknown, unconscious, or undiscovered ecological values.

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Note that the graph could have been drawn differently, such as by exchanging the dotted line with the straight, unbroken curve branching from the same point but to the left of the dotted line (the consequence of the change relates to the conjunction or disjunction of resource sharers and competitors). But all biota use resources, so in this sense, the graph as shown is correct on this point. The choice to show the graph as is reflects that the compatability index is determined more by scientific method than political expediency. Our choice roughly (fuzzily) correlates the compatability of all values here, with consciousness of biodiversity, in terms of the value richness of phenomenological distance, in matching risk and conscious values by an adaptive compatability index. The technical sleight of hand demonstrates the ecological importance of biodiversity and lends weight to the social and economic need to reduce risks to valued biodiversity.

The question remains, what is the best alternative in the DEIS/EIR? The answer should follow from considering how to imbed the relevant values of the ecological systems, including the species, addressed in the DEIS/EIR, in a larger (regional, national, global) situation connecting the phenomenological compatabilities under the imbedding, and maximizing the phenomenological distance for consciousness-of-and-biodiversity, yielding

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the highest possible ecological values, which are shown by the graph on page 4 of this paper to be able to maximally, fuzzily cover the most compatible social, economic, and resource values,

In conclusion I would argue that the above form for compatibility can be best shown to meet the standard of excellence we seek, by any new alternative or combination of old alternatives which maximize conservation biology values restraining management intervention in natural biotic, ecological processes. This must yield the highest compatible phenomenological distance for biodiversity as both an intrinsic value, and for the social, economic, and resource impacts on consciousness.

Finally, to finish on a more personal and emotional note, let me recall two brave defenders of embodied ecological value who worked for conservation-related goals in the environment of the redwoods, and who lost their lives in defending their natural areas, and the broader scope of the meaning of such natural areas of the redwoods for the global environmental crisis.

Here I refer to my dear, late friend Judi Bari (whose mother is, I believe, like myself a theoretical mathematician, and I also refer to the protestor, who I did not know, who recently died under a felled tree

in the area of the DEIS/EIR for Headwaters-Palco SYP-HCP. Judi Bari's death was of course an indirectly related result of injuries incurred through her unique political defense of embodied environmental values centered in California redwood country. It has not been many years since I stood in front of logging trucks or was locked on with chain to Maxxam corporate offices, looking at risk in a different way than the scientific terms of these comments.

The Vietnamese religious leader Thich Nhat Hanh was nominated by Martin Luther King Jr. for a Nobel Prize several years ago. Nhat Hanh said of the nonviolence which transcends politics in its spirituality, that "The essence of nonviolence is love" (Thich Nhat Hanh, 1993). Although ecology is pre-eminent a science, it is also a social force and a religious movement; therefore in choosing nonviolence as well as for scholarly reasons, ecology also is a work of love.

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(see References on
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